

Weekly Report – week of June 6, 2011  
Fabrication and Assembly of ERL hardware  
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**Cryogenics:** The installation of the last phase one cryogenic transfer line is in position and waits for welding. The temperature and controls wiring continues.

**Controls:** The initial version of the software interface for the pulsed RF power meter has been completed. Discussions regarding the beam loss detection system that will incorporate differential current transformer signals for the full ERL began, which will start with an effort to create the software interface to the current source device that will be used with the system. The initial software configuration of the Controls chassis that will support motion controllers is ready for use.

**Instrumentation:** Beam position monitor button pick-ups have been characterized and matched. Enough buttons were provided to the Vacuum group for G5 installation. Testing and software development continues on the one prototype Libera Single Pass BPM electronics module on the bench, results look good. A quote has been received, and paperwork has been started for the procurement of the 5 additional matching Libera units needed for the G5 straight & zig-zag installation phases.

A large cable requisition has been started for the BPM's, profile monitors, HOM pick-ups, and motion control devices.

Beam loss monitor detector (PMT based) fabrication is underway.

The first article high-energy (YAG & OTR) profile monitor from Radiabeam has been received; so far initial particulate-free, vacuum, motion, optics, and illumination tests results look good.

The majority of the motion control (for profile monitors, halo scrapers, pepper pots, gun tuner & cathode, laser transport mirrors, etc...) rack hardware has been installed in the support trailer. We are working on defining the associated Controls interface parameters.

The Integrating Current Transformer electronics (that supports the injection in-flange ICT transducer) has been tested on the bench, results look good. Testing of the spare ICT electronics is next. Effort continues on the design of the necessary support (back-end) electronics for the more complex DCCT systems. The DCCT transducers and associated FE electronics are in house. Effort continues on the beam line mechanical enclosure for the DCCT's and the custom bypass cap across the internal ceramic break. CT system cables are in house but not run in yet. Effort continues on definition of all subsystem Controls interfaces, and descriptions of inputs to the machine protection system.

**Laser:** Conducting simulation studies for 266 nm light production. defective part in Lumera laser identified, ordered replacement + spare from Germany, still awaiting arrival. Climate control in Laser Room is still malfunctioning, this is being addressed by HVAC. Preparations for thermal and alignment tests of cathode launch mirror.

Design work on timing system and interface with low-level RF and diagnostics software continues.

**FPC conditioning:** The FPC's for the ERL are being tested at low power. The conditioning is slow and we have reached 94kw (standing wave with variable locations, which is equivalent to 376kw travelling wave), tripping RF power on the vacuum interlock. We still need to understand the water flow rates for proper cooling at high power operations.

**Photocathode:** An extended bake has been completed with a new stainless steel sample installed in the deposition system. The source arms are now loaded with either Cesium (Cs) and or Potassium (K) and are being baked. This is all in preparation for the making of a multialkali photocathode.

**Gun Cryomodule:** The gun and string assembly are waiting on processing at J-Lab. There are scheduling issues at J-Lab which will delay the return of the string assembly to BNL. The last of the MLI is being installed on the ballast tank and associated piping on the cryomodule. The gun stand and cathode transport cart upgrade have either a RFQ or parts being fabricated in the shops.

**PASS System:** The installation and testing of the VTF PASS system can move forward now the cable tray is reinstalled. The electrical power hooked-up has been scheduled .

**Mezzanine:** A meeting of the mezzanine clean room RFQ evaluation panel took place June 1<sup>st</sup>. The outcome is that we will need to raise the ceiling height which means raising the mezzanine two feet. This is required to process the 56MHz cavity in this clean room.

**Large Grain Gun:** Preparations to ship gun to Jefferson Lab for chemical processing and high-pressure rinsing are underway. Fabrication of plug for choke joint has been completed. Material for fabrication of gasket seals is on order and expected to arrive in next day or so. Shipping documents are complete, and shipment of cavity is expected next week. In the meantime, reference measurements of the gun cavity choke joint grooves are taking place in the Survey and Alignment group. In addition, a purchase order has been submitted for magnetic shielding for Dewar, and the top plate is ready for shipment to vendor for necessary modifications. Finally, the 20 W power amplifier arrangement for low-power testing has been completed and is being calibrated and readied for use.

**5-cell cavity/cryomodule:** The paperwork continues for the G-5 test safety review. The surveyors have started to verify locations of magnet stands for the G-5 test. A fixed date of June 28<sup>th</sup> and 29<sup>th</sup> still stands for the next 5 cell run to test the LLRF feedback loop.

**ERL injection line:** Vacuum envelope is in preparation to final review, correction magnets are under design.

**ERL Extraction line:** Magnets are being fabricated; beam dump pressure vessel code compliance under evaluation, vacuum/instrumentation layout needs to be reviewed and finalized.

**ERL Tech Support Area:** The EEBA area is on hold due to funding issues. Design drawings and cost estimates have been completed. Due to funding constraints for the construction of the enclosure and refurbishment of this area this work is now on hold.

**ERL Vacuum Support:** Vacuum QA of first article Profile Monitor is complete. Most G5 chambers and parts are particulate processed and staged for assembly and leak check. Button BPMs for downstream triplet quadrupole are available. Chamber processing and assembly underway.